SYSTEMS

INTEGRATION

MARKETS

Presented By:

Peter Cunningham
President
INPUT

Contents

- Definitions
- Market forecasts
- Issues
- Program management
- Competition
- Conclusions/trends

NOTES:

SQAD-2

INPUT

2

Definitions

NOTES:

SQAD-48a

Current SI Market Definition

- A business offering

- Complete solution to complex
  requirement for:
  - Information systems
  - Networking
  - Automation

- Custom selection and implementation
  of products and services

NOTES:

INPUT

4

Systems Integrator

The systems integrator will perform, or manage others who perform, most or all of the following functions:

- Program management, including subcontractor management

- Needs analysis

- Specification development

NOTES:

SQAD-4a

INPUT

5

Systems Integrator

- Conceptual and detailed system design/architecture

- System component selection, modification integration, and customization

- Custom software design and development

INPUT

NOTES:

SQAD-4b

INPUT

6

Systems Integrator

- Custom hardware design and development

- System implementation, cutover, test, and evaluation

- Life cycle support, including:
  - System documentation and user training
  - System operation and/or management
  - System maintenance

- Financing

NOTES:

SQAD-4cd

INPUT

The Customization Spectrum

Turnkey	Custom Turnkey	Systems Integration

0%   100%

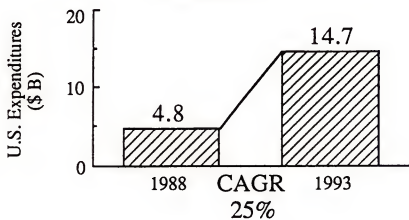Degree of Customization
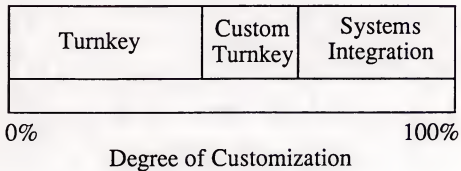
NOTES:

MAAP-17

MPRE89-119

Market Forecasts

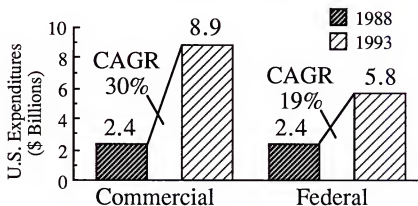
SQAD-48b

INPUT

9

Systems Integration Market Forecast

Notes:

SSEM-JEF-5

Systems Integration
Market Forecast
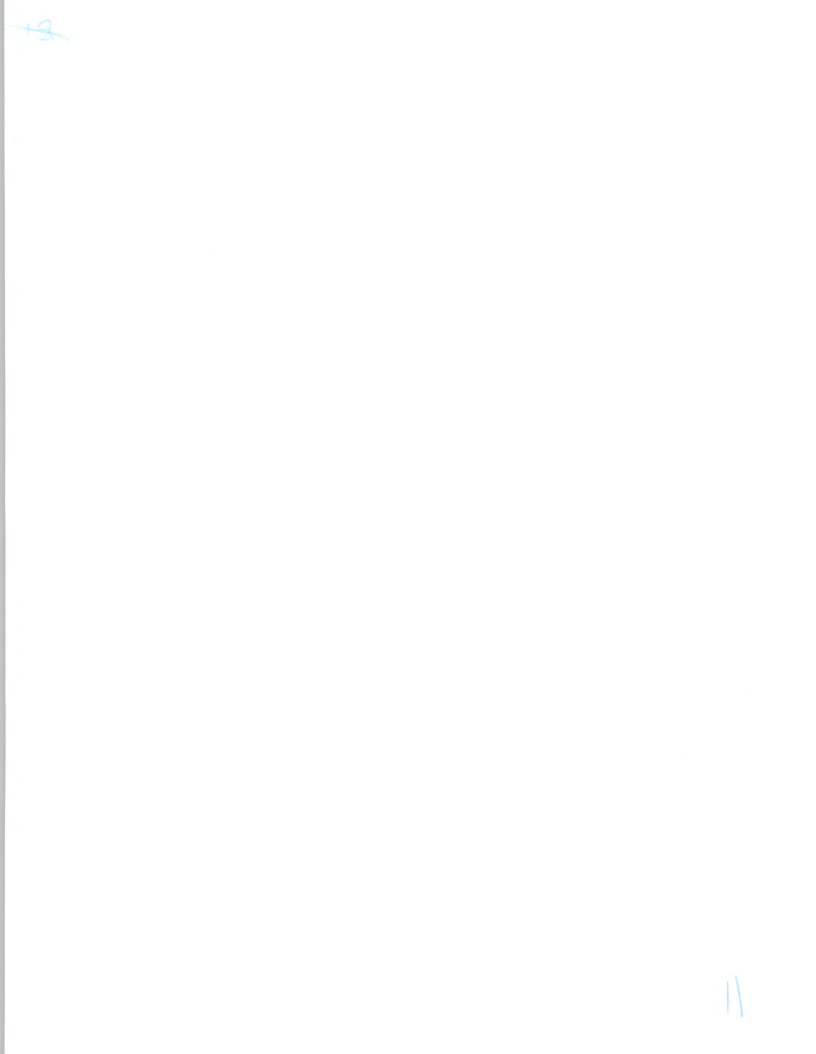
NOTES:

INPUT

Systems Integration Market
1988-1993 Component Groups

Systems Integration Market
1988-1993 Component Groups

CAGR
(Percent)

Packaged Software: 1.1 / 0.4 — 22

Other Services: 0.6 / 0.3 — 15

U.S. Expenditures ($ B)

1993
1988

INPUT

Notes:

INPUT

Issues

NOTES:

14
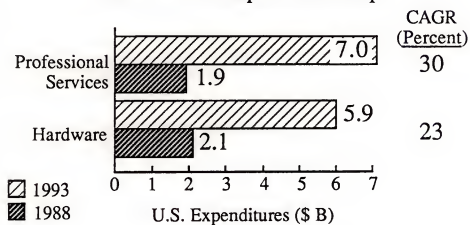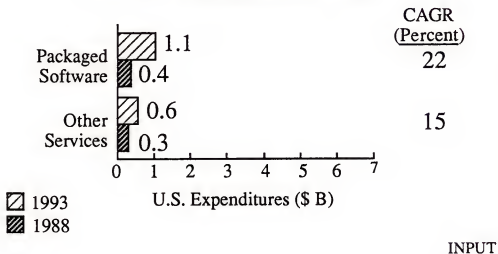
Key Trends for the 1990s

- Products & Services Markets Blurring
- Changing Market Structure
- Internationalization
- Standards
- Vendor Reactions

NOTES:

Major Buyers Issues—1988

- Rising management expectations

- User demands for increasingly complex solutions

- Managing the technology investment

- Integration—data/applications/technology

- "Mission Critical" solutions

INPUT

Notes:

SSEM-JEF-12

INPUT

Major Vendor Issues—1988

- Potential of catastrophic failure

- Resistance from in-house integrators

- Increasing competition—confusion

- Competitive exposure through specific
  project alliances

- Leading-edge technology risks

INPUT

Notes:

INPUT

Vendor Selection Criteria

Type	Percent of Respondents
Industry Experience	86
Application Knowledge	86
Cost/Performance	86
SI Experience	79
Project Management Skills	64

INPUT

Notes:

INPUT

Vendor Selection Criteria

Type	Percent of Respondents
Support Skills	64
Service Orientation	50
On-Site Visits	43
References	43
Alliances	21

INPUT

Notes:

SSEM-JEF-14

INPUT

Problems of Alliances

- Impact of environmental forces ($)
- Short-term differences in performance
- Perception versus actual benefits
- Unwillingness to share key assets
- Difference in culture

INPUT

Notes:

SSEM-JEF-18

INPUT

Minimize Alliance Failures

- Clearly determine common objectives

- Communicate strategy to operating people

- Avoid complexity

- Insulate alliances from partners

Notes:

"Old"

Facilities Management

- Focus on Computer Operations

"New"

Systems Operations

- Development, Planning, Control, Operations

NOTES:

Systems Operations
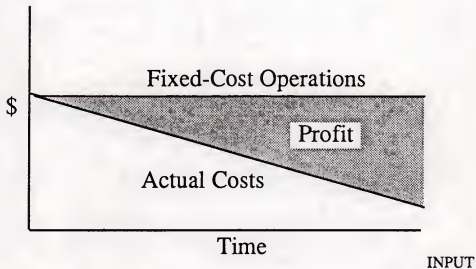# Driving Forces

- Tight Labor Markets
- Difficulty in Paying Competitive Salaries
- Cost of Upgrading Systems
- Backup Requirements
- Systems Integration Creates Opportunities

INPUT

NOTES:

MPRE89-325

INPUT

Systems Operations
Efficiency Yields Profits

Fixed-Cost Operations

Profit

Actual Costs

$

Time

INPUT

NOTES:

MPRE89-326

INPUT

Program
Management

INPUT

NOTES:

INPUT

Vendor Project
Management Issues

- More critical than the ratings indicate
- Continuity of vendor project manager
- Managing the subcontractors key
- Use a third party as QA
- Keep users involved

Notes:

SSEM-JEF-16

Systems Integration
Program Phases

Needs analysis &
requirement definition

Proposal process

Program implementation

Operations & maintenance

INPUT

NOTES:

INPUT

Systems Integration
Performance Phase

Requirements analysis

Systems design

Hardware & software design

Hardware & software development

Systems integration & test

Installation & training

Maintenance & operations

NOTES:

INPUT

Systems Integration
Business Acquisition
Opportunity Qualification

Market Focus

- Seek specification and study projects

- Target marketing

- Track federal programs

- Commercial ad hoc

INPUT

NOTES:

SQAD-23a

INPUT

Systems Integration
Business Acquisition
Opportunity Qualification

Review and Screening

- Technical review board

- Executive review of all RFPs

- Formal screening committees

- Industry marketing screening

INPUT

NOTES:

SQAD-23b

INPUT

Systems Integration
Business Acquisition
Opportunity Qualification

Analysis

- Quantitative bid/no-bid processes

- Customer commitment analysis

- Competitive assessment

- Opportunity and risk assessment

INPUT

NOTES:

SQAD-23c

INPUT

31

Proposal Process
Risk Mitigation

- Management approvals
- Architectural approval
- Insurance and bonding
- Partner risk sharing
- Separate contract phases
- Identify non-fixed-price activities

INPUT

NOTES:

SQAD-25a
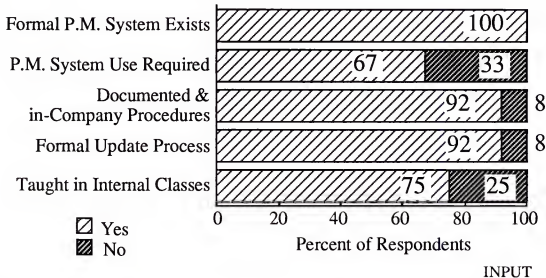
INPUT

Proposal Process
Risk Mitigation

- Quantify all program elements
- Establish baseline
- Examine alternate solutions
- Document assumptions in proposal
- Red/blue team reviews
- Responsibility matrices

INPUT

NOTES:

INPUT

33

Program Management System
Characteristics

Characteristic	Yes	No
Formal P.M. System Exists	100	
P.M. System Use Required	67	33
Documented & in-Company Procedures	92	8
Formal Update Process	92	8
Taught in Internal Classes	75	25

☑ Yes
▨ No

0 20 40 60 80 100
Percent of Respondents

INPUT

NOTES:

SQAD-28

INPUT

Program Management System
Years of Use

Over 10 Years (3)
1-5 Years (5)
6-10 Years (4)
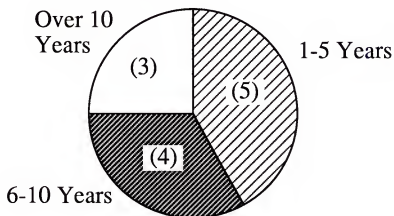
INPUT

NOTES:

INPUT

Program Management System
Organization

P.M. Controls Resources — 25%
Resources Report to Funct. Mgr. — 17%
Both — 58%
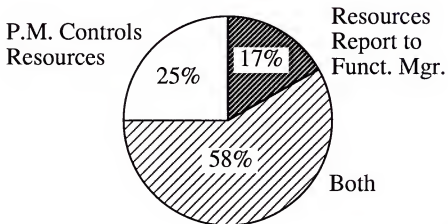
INPUT

NOTES:

INPUT

Program Management Measurements of Success

- On schedule
- Within budget
- Meets technical specifications

NOTES:

Risk Management Tools and Processes

- Bid/no-bid model

- Planning, design, implementation, and management risk assessment models
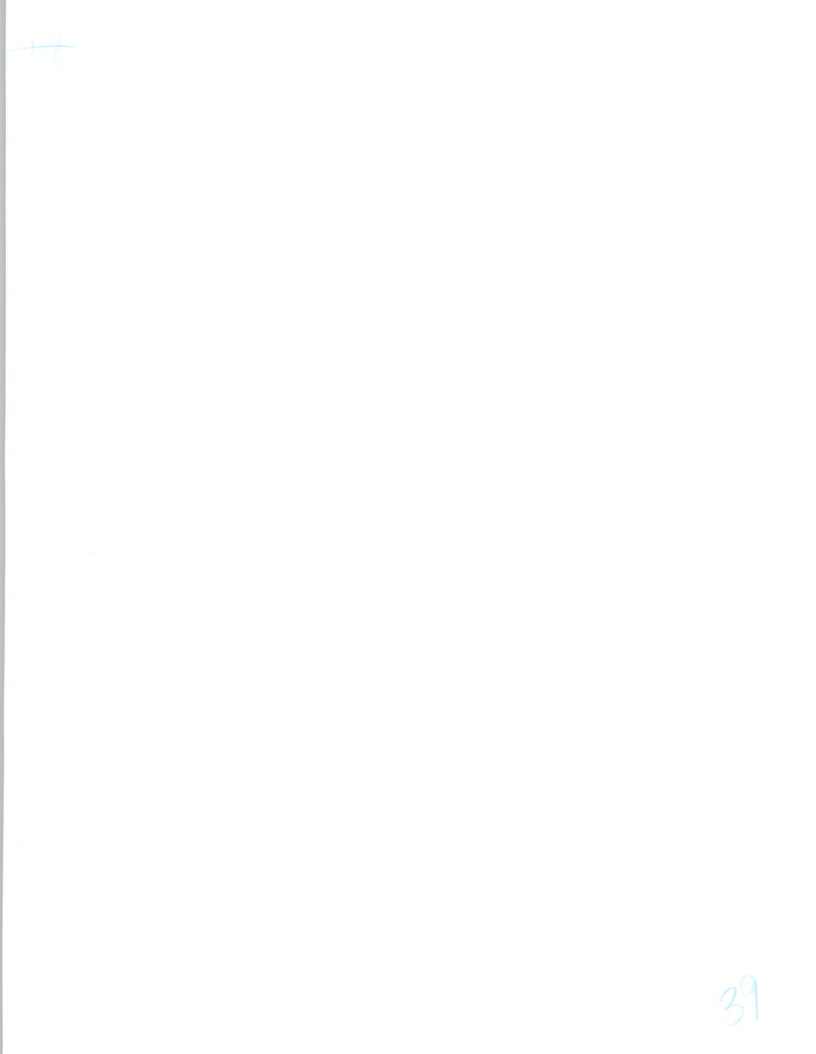
- Change impact models

INPUT

NOTES:

Risk Management Tools and Processes

- Budget and schedule likelihood cancellations

- Regular reviews

- Ongoing quality control reviews

- Independent quality assurance reviews

NOTES:

INPUT

Program Management
Tools and Methodologies

- Focus on productivity and effectiveness

- Used to promote competitive advantage

- Limited use of CASE

- No industry standards

INPUT

INPUT

Program Management Summary

- Include program manager in proposal development

- Employ risk mitigation tools

- Program management essentials
  - Communications
  - Single client point of contact
  - Rigorous change control
  - Realistic plan/schedule
  - Automated tools
  - Well-defined methodologies

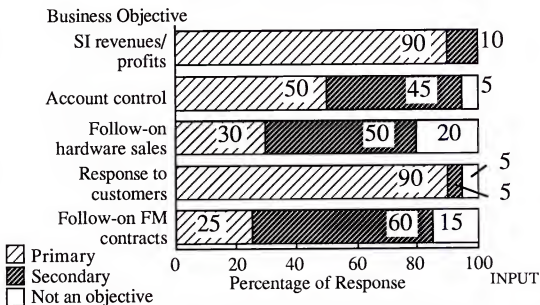- Qualified program managers required   INPUT

NOTES:

SQAD-47ab

INPUT

Competition

NOTES:

INPUT

Analysis of Vendors' SI Business Objectives—Total Population

Business Objective

Business Objective	Primary	Secondary	Not an objective
SI revenues/profits	90	10	
Account control	50	45	5
Follow-on hardware sales	30	50	20
Response to customers	90	5	5
Follow-on FM contracts	25	60	15

Percentage of Response

☑ Primary
▨ Secondary
☐ Not an objective

INPUT

NOTES:

SQAD-9

INPUT

Primary Organizational Structure
for Systems Integrators
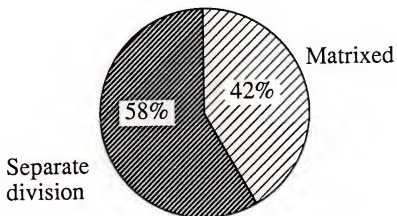
Matrixed 42%

Separate division 58%

INPUT

INPUT

Degree of Centralization of Business Function

SI Business Responsibility	Federal	Commercial
Management strategy & planning	4.0	3.4
Marketing & promotion	2.7	3.4
Account management & sales	2.5	1.8

(1=Totally decentralized, 5=Totally centralized)

INPUT

NOTES:

SSEM-RDW-10a

INPUT

Degree of Centralization of Business Function

SI Business Responsibility	Federal	Commercial
Contract review & approval	3.4	3.1
Project management & control	2.0	2.0

(1=Totally decentralized, 5=Totally centralized)

INPUT

NOTES:

SSEM-RDW-10b

INPUT

Degree of Centralization of Business Function

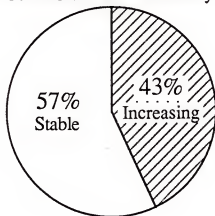| SI Business Responsibility	Federal	Commercial
Development & implementation	1.5	1.5
Hardware/software acquisition	2.7	2.4
Systems operations	2.3	1.6

(1=Totally decentralized, 5=Totally centralized)

INPUT

NOTES:

INPUT

Trends in SI Profitability

Commercial SI Profitability

57% Stable

43% Increasing

Federal SI Profitability

45% Stable

18% Increasing

36% Decreasing
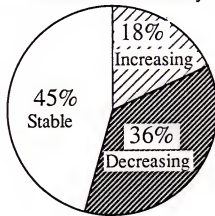
INPUT

NOTES:

SSEM-RDW-16

INPUT

SI Vendors' Market Focus

- Both 22%
- Functional 17%
- Vertical 61%
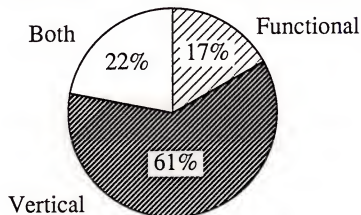
INPUT

NOTES:

INPUT

Target Functional SI Markets

- Telecommunications networking
- Image processing systems/applications
- Office automation implementations
- Logistics systems
- Facilities management

INPUT

Notes:

SSEM-RDW-22

INPUT

SI Competition Ranked by Number of Mentions

- Commercial
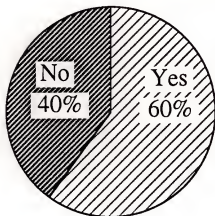 - Andersen Consulting
  - EDS
  - IBM
  - DEC

INPUT

Notes:

SSEM-RDW-24a

INPUT

Formal Alliance Programs

No 40% Yes 60%

Comments:
Hardware mfrs.-100%
Prof. svcs.-67%
Commun. cos.-0%
Aerospace cos.-0%

INPUT

NOTES:

SSEM-RDW-26

INPUT

SI Market Share by Class of Competition, United States, 1988

Vendor Class	Percent of Market		
	Federal	Com-mercial	Overall
Hardware Manufacturers	28	30	29
Communication Vendors	3	11	7
Professional Services	40	36	38
Management Consultants	3	15	9
Aerospace	21	1	11
Other	5	7	6

INPUT

NOTES:

GOV9-DRW-23

INPUT

Leading Systems Integration Vendors, Market Shares, 1988

Vendor	U.S. Revenues ($Millions)	Market Share (%)
IBM	850	18
EDS/GM	505	12
Andersen Consulting	383	9
CSC	345	8

INPUT

Notes:

SSEM-JEF-30

INPUT

Leading Systems Integration Vendors, Market Shares, 1988

Vendor	U.S. Revenues ($Millions)	Market Share (%)
Unisys	335	7
SAIC	280	6
Grumman	250	6
Boeing	200	5

INPUT

Notes:

SQAD-14

INPUT

Vendor Profiles:
Andersen Consulting

- Business Duration
  - 10 Years

- Organization
  - Decentralized, Vertical Market
    Implementation Staff

- Dedicated Resources
  - 15,000 (Worldwide) Employees
    in Systems Integration and
    Professional Services   INPUT

NOTES:

SIOS-54.01ab

INPUT

Vendor Profiles:
Andersen Consulting

- Target Industries
  - Aerospace
  - Manufacturing
  - Utilities
  - Distribution
  - Finance

NOTES:

Vendor Profiles:
Andersen Consulting
Strengths

- Consulting Expertise, Depth of Staff

- Systems/Product Demonstration Centers

- High-Level Client Contacts

INPUT

NOTES:

SIOS-54.03a

INPUT

Vendor Profiles:
Andersen Consulting
Strengths

- Growing Reputation as SI Providers

- Reorganization to Focus on
  Professional Services and SI

- Software Development Methodology

NOTES:

SIOS-54.03b

Vendor Profiles:
Andersen Consulting
Weaknesses

- Possible Cash Constraints

- Perception as Accounting Firm

- Network Management Skills

INPUT

NOTES:

SIOS-54.04

INPUT

Vendor Profiles:
Andersen Consulting
SI Strategies

- Strong Promotional/Marketing Thrust

- Reorganization for Consulting Focus

- Demonstration Systems/Centers
  (Vertical Markets)

INPUT

NOTES:

SIOS-54.05a

INPUT

Vendor Profiles:
Andersen Consulting
SI Strategies

- Continuing Employee Education

- Focus on Largest Accounts

- Leverage "Complete Solution"
  Capabilities

INPUT

NOTES:

SIOS-54.05b

INPUT

Computer Sciences Corp/Infonet

- Continues strong in federal markets
  - Primarily professional services/SI
- Resurgent interest in commercial markets
  - Health and insurance
  - Tax and credit
  - Professional services/SI
- Acquisitions key to commercial activities
  - Index
  - Computer Partners

INPUT

Notes:

ZCUT-26a,b

Computer Science Corp/Infonet

- Infonet is now separate company
  - Focused on network services
  - Provides "enhanced network management" services
  - Also provides processing services
- Infonet ownership is distributed:
  - Minority CSC ownership
  - International PTTs major investors

Notes:

ZCUT-27a,b

Vendor Profiles: Computer Sciences

- Business Duration
  - 21 Years

- Organization
  - Centralized Marketing and Promotion
  - Decentralized Contract Review/
    Approval, Project Management

- Dedicated Resources
  - 2,500

INPUT

NOTES:

SIOS-54.12

INPUT

Vendor Profiles: Computer Sciences

- Target Industries
  - Government
  - Distribution
  - Finance
  - Insurance
  - Telecom Providers
  - Retail
  - Publishing
  - Manufacturing

NOTES:

SIOS-54.13ab

Vendor Profiles: Computer Sciences

- Target Functions
  - Networking
  - Office Automation
  - Digital Image Handling
  - Facility Management
  - Logistics

NOTES:

Vendor Profiles: Computer Sciences
Strengths

- Full-Service Provider

- Depth/Diversity of Staff

- Hardware-Independent Vendor

- Reputation for Performance

- Networking

INPUT

NOTES:

SIOS-54.15

INPUT

Vendor Profiles: Computer Sciences
Weaknesses

- Small (Relative) Commercial Sector Presence

- Focused on Narrow Markets, in Terms of Current Results

NOTES:

SIOS-54.16

Vendor Profiles: EDS

- Primary Motivation to Drive FM

- Limited in Alliances

- Potentially Hindered by GM Relationship

INPUT

NOTES:

SIOS-56a

INPUT

Vendor Profiles: EDS

- Strengths
  - Understand Vertical Targets
  - Technical Skills/Communications

- Weaknesses
  - Image/Limited Alliances

NOTES:

SIOS-55b

Vendor Profiles: EDS

- Extensive Large Project Management Experience

- Typical Project Size $5-30M

- About 50 Projects 1987-88

INPUT

NOTES:

INPUT

Vendor Profiles: EDS

- Target Industries
  - Manufacturing
  - Banking/Finance
  - Health Care
  - Telecommunications
  - Distribution
  - State & Local Government

- Unique Capabilities
  - Proven FM Record
  - Network Management

INPUT

NOTES:

SIOS-57ab

INPUT

IBM

- Fundamental changes
  1. Sales incentives for services
  2. Willingness to provide systems operations services

Notes:

ZCUT-19

INPUT

Vendor Profiles: IBM

- Business Duration
  - 20+ Years in SI

- Organization
  - Centralized Account Management and Sales
  - Decentralized Contract Approval, Project Control

INPUT

NOTES:

SIOS-54.18a

Vendor Profiles: IBM

- Dedicated Resources
  - 6,000-8,000 People in
    Systems Integration Division
    (SID)

NOTES:

SIOS-54.18b

IBM National Services Division

- Will provide systems operations for customers
- 30,000 people
- Works with IBM's SID and INS operations

Notes:

ZCUT-17

IBM National Services Division

- Provides all "operations support" functions

    - Data center design and building

    - Remote, "Lights-out" data center operations

    - Hardware/software/network maintenance

    - Disaster recovery

    - End-user software support

    - Systems operations studies

    - Conversion services

INPUT

Notes:

ZCUT-18a,b

Vendor Profiles: IBM
Strengths

- Market Presence

- Installed Base

- Resource Access

- Long-Term Account
  Relationships

NOTES:

SIOS-54.19a

Vendor Profiles: IBM
Strengths

- Full Equipment Range

- Third-Party Suppliers

- Subcontractor Relationships

- Education, Training, Documentation

- Vertical Market Expertise

INPUT

NOTES:

SIOS-54.19b

INPUT

Vendor Profiles: IBM
Weaknesses

- Internal Bureaucracy

- Speed of Response

- Product Orientation

- Nonintegrated Products

- Project Management Methodologies
  and Skills

- Pricing: Low Flexibility

NOTES:

Vendor Profiles: IBM

SI Strategies

- Stress Advanced Functions: AI, Image Processing, Networking, Connectivity

- Massive Reorganization into SID

- Emphasize Software and Connectivity

- Third-Party SW Leverage (2500 Programs on AS/400)

- Decentralized Decision Making

INPUT

NOTES:

INPUT

Conclusions/Trends

NOTES:

Summary/Conclusions

- SI Drivers
  - Customer business needs
  - Technology availability
  - Personnel constraints
  - Vendor profit/channels

Notes:

SSEM-RDW-30a

Summary/Conclusions

- Financial Characteristics

  - Rapid revenue growth

  - Commercial profits - stable/increasing

  - Federal profits - stable/decreasing

  - Highest margins: design/consulting software development

INPUT

Notes:

SSEM-RDW-30c

INPUT

Summary/Conclusions

- Organization Approach
  - Separate divisions will dominate
  - Implementation will be decentralized

Notes:

SSEM-RDW-30b

Consolidation in the Industry
A Dominant Industry Phenomenon in the 1990s:

- A Smaller Number of Larger Vendors
- Providing a Broader Range of Integrated Offerings
- Supported by Smaller Niche Vendors
- Targeted at Providing Solutions

INPUT

NOTES:

JJ88-DW1-30

MPRE89-27

IMAGE -
NOT USED
FOR PETER
PRESENTATION
IN JAPAN
9/89

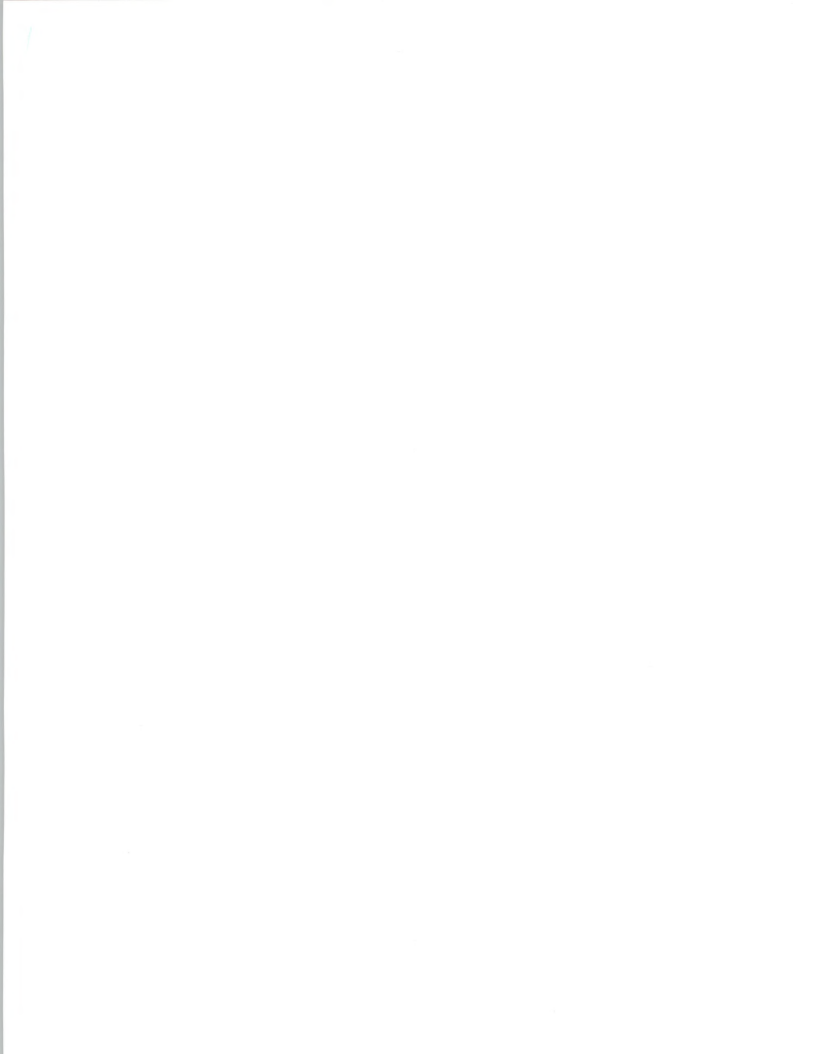# Differences between Systems Integrators and Turnkey Systems Vendors

Systems Integrators	Turnkey Vendors
Strategic design and consulting	Tactical consulting
High level of complexity	Modest complexity

INPUT

INPUT

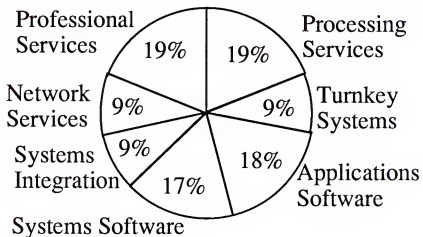# Differences between Systems Integrators and Turnkey Systems Vendors

Systems Integrators	Turnkey Vendors
Significant software development	Focus on software products
High cost	Modest cost
Large project management skills	Focus on implementation management

NOTES:

SQAD-5b

INPUT

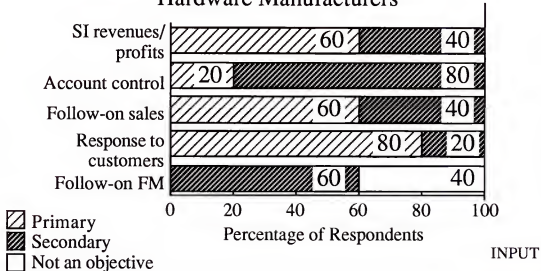# Projected Information Services Markets by Mode, 1993

Professional Services 19%

Processing Services 19%

Network Services 9%

Turnkey Systems 9%

Systems Integration 9%

Applications Software 18%

Systems Software 17%

INPUT

NOTES:

INPUT

Analysis of Vendors' SI Business Objectives by Company Class
Hardware Manufacturers

INPUT

NOTES:

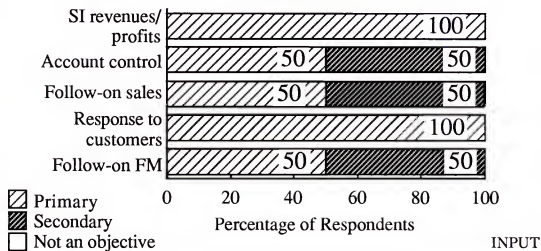# Analysis of Vendors' SI Business Objectives by Company Class
Professional Services

Horizontal bar chart — Percentage of Respondents (0 to 100):

- **SI revenues/profits:** Primary 100
- **Account control:** Primary 33, Secondary 67
- **Follow-on sales:** Primary 22, Secondary 56, Not an objective 22
- **Response to customers:** Primary 100
- **Follow-on FM:** Primary 22, Secondary 67, Not an objective 11

Legend:
- Primary
- Secondary
- Not an objective

NOTES:

SQAD-11

INPUT
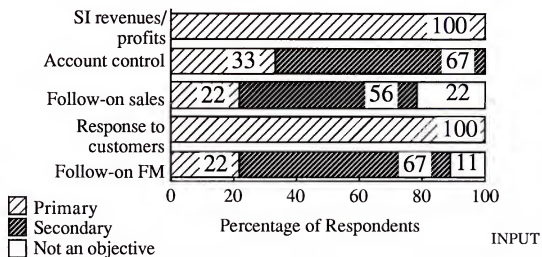
Analysis of Vendors' SI Business Objectives by Company Class

Telecom

	Primary	Secondary	Not an objective
SI revenues/profits	100		
Account control	50	50	
Follow-on sales	50	50	
Response to customers	100		
Follow-on FM	50	50	

Percentage of Respondents (0, 20, 40, 60, 80, 100)

Legend:
- Primary
- Secondary
- Not an objective

INPUT

Analysis of Vendors' SI Business
Objectives by Company Class
Aerospace

	Primary	Secondary	Not an objective
SI revenues/profits	100		
Account control	67		33
Follow-on sales	67	33	
Response to customers	67		33
Follow-on FM	33	67	

Percentage of Respondents
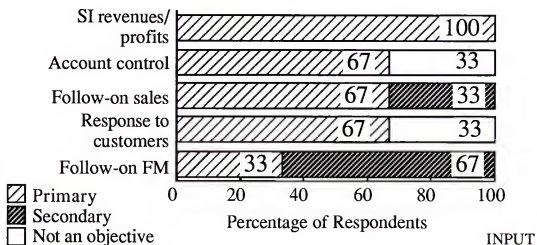
NOTES:

SQAD-13

INPUT

Systems Operations

- Growth for the 1990s

- Andersen Consulting and IBM entries

- Major vendor and client interest

NOTES:

Systems Operations Market
Forecast, 1988-1993
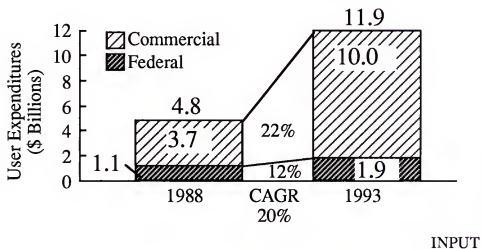
INPUT

NOTES:

Total U.S. Systems Operation Market Share by Revenue, 1988

Rank	Vendor	Market Share (%)
1	EDS/GM	16
2	Computer Sciences Corp.	5
3	McDonnell Douglas	4
4	Shared Medical Systems	3
5	Boeing Computer Services	3
6	Systematics	3

INPUT

NOTES:

INPUT

Program Management

Total systems integration management responsibility, including:

- Development

- Integration and test

- And sometimes life cycle support

NOTES:

INPUT

Systems Integration
Program Management Success Factors
Vendors' View

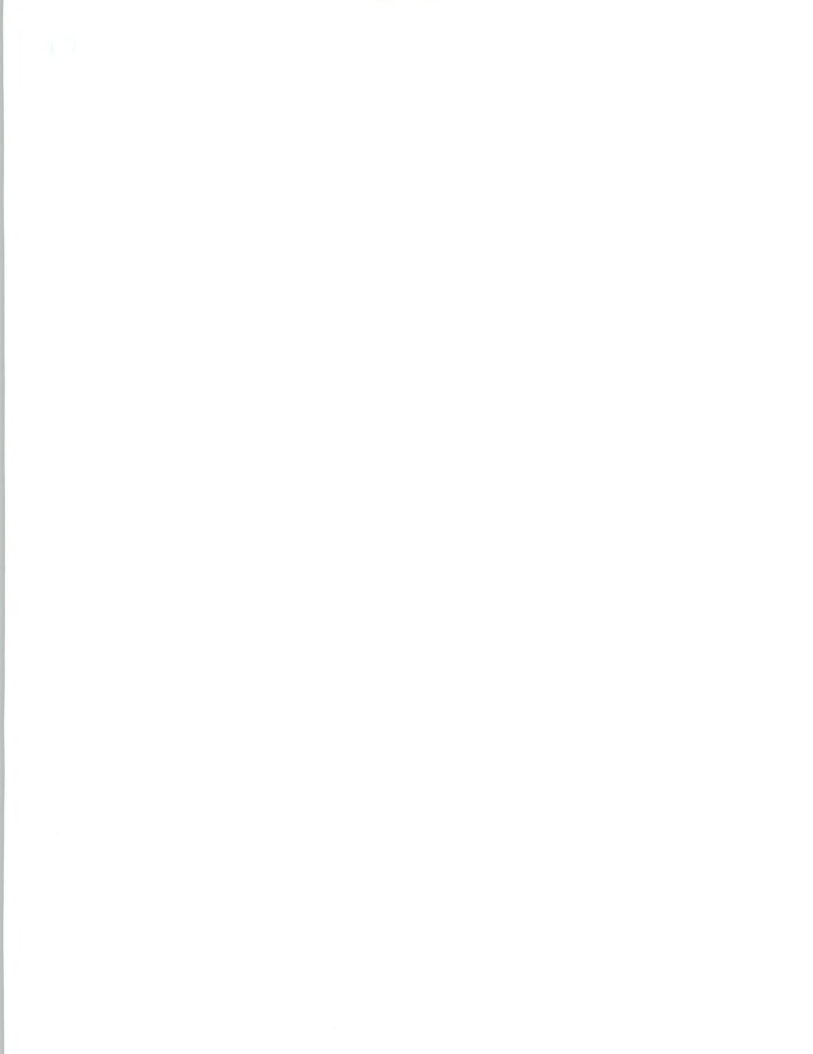|	
Communications	(5)
Adequate specifications	(4)
Project plan & schedule	(4)
Good disciplined project manager	(4)
Repeatable methodology	(3)

INPUT

NOTES:

SQAD-22a

INPUT

Systems Integration
Program Management Success Factors
Vendors' View

Adequate staffing	(2)
Understanding clients' needs & goals	(2)
Milestones	(2)
Management of customer expectations	(2)
Change management	(2)

INPUT

NOTES:

SQAD-22b

INPUT

Client Provides Complete Specification

Yes (2)

No (7)

Varies (3)
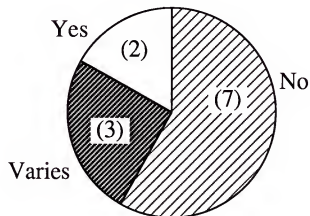
INPUT

INPUT

Program Manager Assignment
(Vendor Response)

After Award
8%
Depends on
8% Complexity
During
Proposal
Process
84%
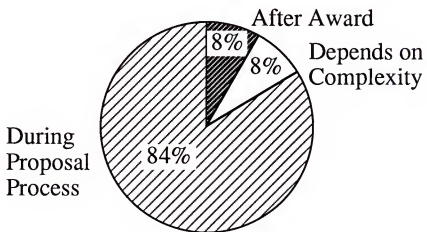
INPUT

Program Manager Assignment
(Client View)

After Award

59%   41%

During
Proposal
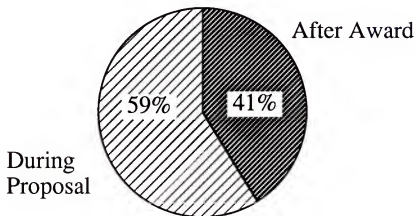
INPUT

INPUT

NOTES:

Program Management System
Initial Motivation

- Federal Requirements (2)
- Commercial Requirements (1)
- Fed. & Comm. Requirements (2)
- Internal Control (7)
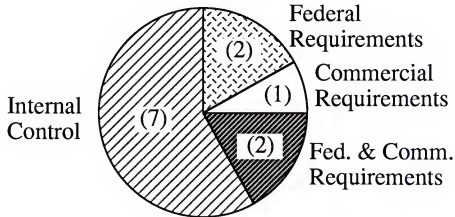
INPUT

NOTES:

SQAD-30

INPUT

Technical Management Factors

Success
- Well-written, detailed, structured, consistent specifications and signoff

- Understanding the customer's business needs

- Rigorous change control system

- Appropriate staffing

NOTES:

SQAD-33a

INPUT

Technical Management Factors

Failure
- Incomplete technical specifications

- Scope containment

NOTES:

INPUT

Schedule Management Factors

Success
- Realistic plan

- Measurement technique/milestones

- Reasonable schedule

- Accurate estimates

INPUT

NOTES:

SQAD-34a

INPUT

Schedule Management Factors

Failure
- Not controlling scope

- Poor or optimistic estimates

- Unrealistic customer schedule

NOTES:

Cost Management Factors

Success
- Adequate requirements definition
- Tracking and monitoring system
- Realistic project plan
- Completion/acceptance criteria
- Change control

NOTES:

SQAD-35a

INPUT

Cost Management Factors

Failure
- Creeping elegance in requirements/scope

- Poor planning and estimating

- Lack of detailed specifications

NOTES:

Systems Integration Vendor Client Interface Preference

- Full-time project officer

- Single point of contact

- Decision authority

- Procurement manager for contractual issues

INPUT

NOTES:

SQAD-37

INPUT

Program Communications

Topics • Status
       • Actions
       • Change

Techniques • Periodic reports
           • Periodic reviews
           • Newsletters
           • Subcontractor managers
           • Program workbooks
           • Marketing representatives
           • Informal communications

INPUT

NOTES:

SQAD-38ab

INPUT

Change Management
System Components

- Written requests from client

- Written cost and schedule sizing
  from vendor

- Vendor and client signoffs

- Change tracking
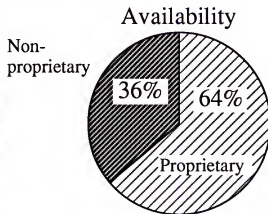
INPUT

SQAD-39
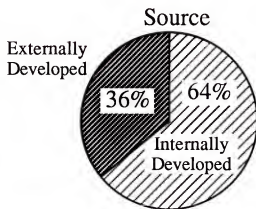
INPUT

Program Tools and Methodologies

- Life cycle methodologies
- Development methodologies
- Schedule and event tracking
- Budgeting and budget tracking
- Change management and tracking
- Trouble reporting and tracking
- Communications
- Computer-aided systems engineering (CASE)

NOTES:

SQAD-40ab

INPUT

Program Management Tools

Source

Externally Developed — 36%
Internally Developed — 64%

Availability

Non-proprietary — 36%
Proprietary — 64%

INPUT

NOTES:

INPUT

Program Manager Sources

Internal
- Promote from deputy program manager, project leader, and general analyst

- Exceptional technical personnel

- Business managers

- Development, sales, or marketing

External
- Competitors

- Large users with D.M. experience

INPUT

NOTES:

SQAD-43ab

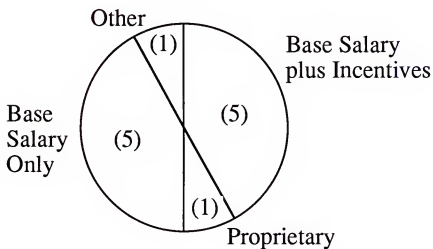**INPUT**

Program Manager Measurement

- Cost—within budget
- Schedule—on time
- Program success—customer satisfaction
- Revenue, expenses, and profit
- Technical progress versus cost

INPUT

NOTES:

SQAD-44

INPUT

Program Manager Compensation

Other (1)

Base Salary plus Incentives (5)

Base Salary Only (5)

Proprietary (1)

NOTES:

SQAD-45

INPUT

Program Manager Incentives

Compensation-Based
- Business unit profits

- Completion on time and below budget

- Cost and schedule milestones

NOTES:

SQAD-46a

INPUT

Program Manager
Incentives

Other
- Promotion

- Challenge

- Awards

- Recognition events

INPUT

NOTES:

SQAD-46b

INPUT